MA 28C(84)-1

CURRENT INDUSTRIAL REPORTS

Industrial Gases

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SUMMARY OF FINDINGS

Value of shipments of industrial gases in 1984 totaled $2,334.4 million. Compared with 1983, the 1984 value of shipments decreased 1 percent for acetylene, while value of shipments for nitrogen and oxygen increased 14 percent and 10 percent, respectively.

Quantity of shipments increased for most gases: acetylene increased 7 percent, nitrogen shipment increased 14 percent, and oxygen shipments increased 9 percent.

Monthly statistics for specified gases for 1983 and 1984 are shown in table 10. These monthly statistics supersedes those which were released earlier in the monthly Current Industrial Reports Series, M28C, *Industrial Gases*, United States Production.

A description of the survey methodology and other related information appears on page 10.

Table 1. PRODUCTION AND SHIPMENTS OF SELECTED INDUSTRIAL GASES: 1980 TO 1984

(Production and quantity of shipments in million cubic feet; value in million dollars)

Product code	Product and year	Production	Shipments	
			Quantity	Value
28132	Acetylene:			
	1984	4,968	2,879	142.4
	1983	3,901	r2,671	143.9
	1982	3,824	2,805	155.3
	1981	5,166	3,451	165.3
	1980	5,493	3,779	172.8
28133	Carbon dioxide:			
	Gas (short tons):			
	1984	r3,481,547	2,791,019	r29.4
	1983	r3,361,019	2,709,246	r27.8
	1982	2,987,451	3,270,077	27.4
	1981	3,766,505	2,156,131	18.1
	1980	(1)	(1)	(1)
	Liquid (short tons):			
	1984	4,209,147	3,984,100	252.0
	1983	3,552,611	3,408,890	165.5
	1982	3,475,362	3,374,615	154.4
	1981	3,451,889	3,296,606	2135.4
	1980	2,656,305	2,557,954	2106.0
	Solid (dry ice) (short tons):			
	1984	355,708	352,600	28.4
	1983	366,106	365,907	r32.9
	1982	344,328	344,107	37.8
	1981	340,167	339,997	33.0
	1980	348,360	348,350	30.0
28135	Nitrogen:			
	1984	660,527	613,741	712.3
	1983	560,124	527,838	653.1
	1982	482,726	447,437	619.2
	1981	489,666	445,890	535.9
	1980	479,240	434,617	448.5
28136	Oxygen:			
	1984	390,465	350,155	653.6
	1983	345,881	318,207	591.0
	1982	348,814	322,165	600.6
	1981	430,616	388,252	594.2
	1980	430,977	381,256	496.3
28137 pt.	Hydrogen:			
	1984	107,359	54,125	190.5
	1983	103,354	r48,568	167.2
	1982	88,131	41,120	163.7
	1981	104,817	47,285	166.5
	1980	108,562	50,667	139.4

pt. Part. rRevised by 5 percent or more from previously published figures.

[1]Approximately 30 establishments producing carbon dioxide gas as a byproduct were added to this survey in 1981. These plants, which previously were excluded in error, accounted for approximately 75 percent of total production for 1981. Comparable data for 1980 and prior years are not available.

[2]Approximately 15 establishments producing carbon dioxide liquid were added to this survey in 1981. These plants, which previously were excluded in error, accounted for approximately 15 percent of the total production for 1981. Production data for these plants are not included in the data shown for 1980 and prior years; therefore, these data are not directly comparable to the 1981 figures.

Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Yvonne Baskerville, (301) 763-7837

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Table 2. PRODUCTION AND SHIPMENTS OF INDUSTRIAL GASES: 1984 AND 1983

(Production and quantity of shipments in million cubic feet; value in thousands of dollars)

Product code	Product description	1984			1983		
			Shipments			Shipments	
		Production	Quantity	Value	Production	Quantity	Value
2813- --	Industrial gases	(X)	(X)	2,334,382	(X)	(X)	r2,035,185
28132 --	Acetylene[1]	4,968	2,879	142,380	3,901	r2,671	143,927
28132 11	Produced for compression, including cylinder and pipeline	1,113	1,057	79,249	1,123	1,110	83,117
28132 21	Produced for pipline shipment (excluding that shipped to be compressed) and for consumption in this plant	3,855	1,822	63,131	r2,778	r1,561	60,810
28133 --	Carbon dioxide[2]	(X)	(X)	309,837	(X)	(X)	226,213
28133 01	Gas (short tons)	3,481,547	2,791,019	29,417	3,361,019	2,709,246	27,825
28133 02	Liquid (short tons)	4,209,147	3,984,100	252,027	3,552,611	3,408,890	165,524
28133 31	Solid (dry ice) (short tons)	355,708	352,600	28,393	366,106	365,907	32,864
28135 --	Nitrogen[3]	660,527	613,741	712,337	560,124	527,838	653,135
	Gas:						
28135 11	Produced for pipeline shipment	469,055	463,057	317,389	191,027	386,441	289,750
28135 13	Produced for consumption in this plant	18,035	(X)	(X)	18,192	(X)	(X)
	Liquid:						
28135 21	Produced for bulk delivery shipment to pipeline or to other air separation plants	9,693	8,092	12,224	11,330	8,835	r13,757
28135 23	Produced for consumption in this plant	6,220	(X)	(X)	r5,107	(X)	(X)
28135 41	Liquid and gas, produced for cylinder and bulk delivery shipment	157,524	142,592	382,724	134,468	132,562	349,628
28136 --	Oxygen[3]	390,465	350,155	653,648	345,881	318,207	r591,028
28136 11	Gas, produced for pipeline shipment	278,516	275,561	424,545	249,876	249,858	403,280
28136 21	Liquid, produced for bulk shipment to pipeline or to other air separation plants	(4)	(4)	(4)	(4)	(4)	(4)
	Liquid and gas:						
28136 31	Produced for cylinder and bulk delivery shipment	477,664	474,594	4229,103	468,850	468,349	4187,748
28136 41	Produced for consumption in this plant	34,285	(X)	(X)	r27,155	(X)	(X)
28137 --	Elemental gases and other industrial gases n.e.c.	(X)	(X)	477,917	(X)	(X)	388,507
28137 15	Argon, high purity produced for cylinder and bulk delivery, pipeline shipments, and for consumption in this plant	10,587	10,354	187,345	8,330	8,296	135,527
	Helium[5]	1,174	1,637	(X)	575	1,363	(X)
28137 20	Hydrogen, liquid and gas[6]	107,359	54,125	190,528	103,354	48,568	167,233
28137 21	Produced for cylinder and bulk delivery shipment	11,158	10,730	100,394	8,977	8,995	75,922
28137 31	Produced for pipeline shipment and Government use	35,829	43,395	90,134	34,365	r39,573	91,311
28137 41	Produced for consumption in this plant	60,372	(X)	(X)	60,012	(X)	(X)
28137 98	Other industrial gases n.e.c., including crude argon, nitrous oxide, carbon dioxide produced and transferred for further processing, and crude and high purity helium produced in privately owned plants[7]	(X)	(X)	100,044	(X)	(X)	r85,747
28130 00	As estimated for Current Industrial Reports Series MA28C (n.s.k. - see note)	(X)	(X)	38,263	(X)	(X)	33,375

Note: N.s.k. represents the value of shipments for establishments which did not provide detailed information by type of product. These establishments, typically with less than 5 employees, are not included on the MA28C mailing panel. The n.s.k. value has been estimated for Series MA28C based on the rate of change for the reporting establishments applied to the previous year's figure.

(X) Not applicable. N.e.c. Not elsewhere classified. rRevised by 5 percent or more from previously published figures.

[1]Excludes information from railroad ships, shipyards, welding shops, and small establishments using portable generators.
[2]Excludes quantities produced and consumed in plants manufacturing soda ash or urea.
[3]Excludes amounts produced and consumed in the manufacture of synthetic ammonia or ammonia derivatives.
[4]Data for liquid oxygen produced for bulk delivery shipment are combined with liquid and gas oxygen produced for cylinder and bulk delivery shipment to avoid disclosing figures for individual companies.
[5]Source: U.S. Department of Interior, Bureau of Mines.
[6]Excludes amounts vented, used as fuel, etc., and amounts produced and consumed in the manufacture of synthetic ammonia and methanol, but includes an unspecified amount produced for sale or interplant transfer to plants consuming this gas in the production of ammonia. Also excludes amounts produced by the ammonia dissociation process (cracking of ammonia). Also excludes amounts produced in petroleum refineries for captive use.
[7]Excludes hydrocarbon gases such as propane, butane, and propylene, or halogenated hydrocarbons and cyclopropane, which are published in the U.S. International Trade Commission annual report Synthetic Organic Chemicals. Also, excludes sulfur dioxide and chlorine data, which are shown in Current Industrial Reports Series MA28A(84)-1, Inorganic Chemicals.

Table 3. PRODUCTION AND SHIPMENTS OF ACETYLENE, BY GEOGRAPHIC AREA: 1984 AND 1983

(Production and quantity in million cubic feet; value in thousands of dollars)

Geographic area	1984			1983		
		Shipments			Shipments	
	Production	Quantity	Value	Production	Quantity	Value
Total	4,968	2,879	142,380	3,901	r2,671	143,927
Northeast Region and North Central Region	471	461	34,112	471	457	34,206
South Region	4,306	2,226	93,459	3,231	r2,017	94,663
West Region	191	192	14,809	199	197	15,058

rRevised by 5 percent or more from previously published figures.

Table 4. PRODUCTION AND SHIPMENTS OF CARBON DIOXIDE, BY GEOGRAPHIC AREA: 1984 AND 1983

(Production and quantity in short tons; value in thousands of dollars)

Geographic area	Gas			Liquid			Solid (dry ice)		
		Shipments			Shipments			Shipments	
	Production	Quantity	Value	Production	Quantity	Value	Production	Quantity	Value
1984									
Total	3,481,547	2,791,019	29,417	4,209,147	3,984,100	252,027	355,708	352,600	28,393
Northeast Region	(D)	(D)	-	193,728	194,063	10,967	32,670	32,670	2,332
North Central Region	786,865	474,933	3,536	1,331,334	1,252,271	109,341	114,136	112,060	11,099
East North Central	555,861	305,930	2,718	908,510	847,705	39,971	91,206	89,113	9,539
West North Central	231,004	169,003	818	422,824	404,566	69,370	22,930	22,947	1,560
South Region	2,407,686	2,120,055	24,510	2,127,239	2,045,322	107,386	157,051	157,051	8,215
South Atlantic and East South Central	265,966	154,554	1,043	1,317,347	1,308,488	76,488	29,355	29,355	2,903
West South Central	2,141,720	1,965,501	23,467	809,892	736,834	30,898	127,698	127,696	5,312
West Region	278,721	187,756	1,371	556,846	492,444	24,333	51,491	50,819	6,747
Mountain	103,749	17,668	314	15,578	112,645	4,573	5,319	4,647	521
Pacific	174,972	170,088	1,057	441,268	379,799	19,760	46,172	46,172	6,226
1983									
Total	3,361,019	2,709,246	r27,825	3,552,611	3,408,890	165,524	366,106	365,907	r32,864
Northeast Region	-	-	-	158,803	158,803	8,723	(D)	(D)	(D)
North Central Region	r664,983	r460,172	3,777	r1,027,137	r982,294	45,645	(D)	(D)	(D)
East North Central	(D)	(D)	(D)	r700,046	653,387	34,819	r101,906	r101,906	r11,883
West North Central	(D)	(D)	(D)	327,091	328,907	10,826	(D)	(D)	(D)
South Region	2,344,230	1,981,632	22,344	r1,868,855	r1,804,575	89,611	132,290	132,290	r8,114
South Atlantic and East South Central	(D)	(D)	(D)	r1,063,461	r1,055,757	r58,753	27,973	27,973	3,306
West South Central	(D)	(D)	(D)	805,394	r748,818	30,858	104,317	104,317	r4,808
West Region	r351,896	267,442	1,704	r497,816	r463,218	r21,545	(D)	(D)	(D)
Mountain	(D)	(D)	(D)	107,335	108,229	(D)	(D)	(D)	(D)
Pacific	(D)	(D)	(D)	r390,481	r354,989	(D)	41,292	41,292	r5,254

- Represents zero. (D) Data withheld to avoid disclosing figures for individual companies. rRevised by 5 percent or more from previously published figures.

Table 5. SHIPMENTS OF ARGON (HIGH PURITY), BY GEOGRAPHIC AREA: 1984 AND 1983

(Quantity in million cubic feet; value in thousands of dollars)

Geographic area	1984		1983	
	Quantity	Value	Quantity	Value
Total	10,354	187,345	8,296	135,527
Northeast Region	1,047	21,149	1,087	20,884
North Central Region	4,339	75,078	3,464	54,972
Ohio	1,520	24,497	1,146	17,428
South Region	4,074	74,795	2,834	44,460
South Atlantic Division	1,227	27,694	796	12,244
East South Central Division	384	8,397	r272	6,874
West South Central Division	2,463	38,704	1,766	25,342
West Region	894	16,323	911	15,211
California	429	7,013	493	7,370

rRevised by 5 percent or more from previously published figures.

Table 6. PRODUCTION AND SHIPMENTS OF HYDROGEN (TOTAL), BY GEOGRAPHIC AREA: 1984 AND 1983

(Production and quantity in million cubic feet; value in thousands of dollars)

Geographic area	1984			1983		
		Shipments			Shipments	
	Production	Quantity	Value	Production	Quantity	Value
Total	107,359	54,125	190,528	103,354	r48,568	167,233
Northeast Region	8,186	5,726	24,755	9,452	r5,816	r22,502
North Central Region	6,790	2,968	15,451	r7,035	r3,041	r13,442
South and West Regions	92,383	45,431	150,322	86,867	r39,711	131,289
East South Central Division	2,271	441	2,144	3,326	717	3,542
West South Central Division	76,282	38,935	107,960	69,810	r32,668	91,692

rRevised by 5 percent or more from previously published figures.

Table 7. PRODUCTION AND SHIPMENTS OF NITROGEN (TOTAL), BY GEOGRAPHIC AREA: 1984 AND 1983

(Production and quantity in million cubic feet; value in thousands of dollars)

Geographic area	1984			1983		
		Shipments			Shipments	
	Production	Quantity	Value	Production	Quantity	Value
Total	660,527	613,741	712,337	560,124	527,838	653,135
Northeast Region	71,828	59,717	105,826	59,287	56,166	98,259
New England Division	7,086	6,224	13,071	6,492	6,387	13,184
Middle Atlantic Division	64,742	53,493	92,755	52,795	49,779	85,075
New York	21,288	14,150	28,561	16,471	13,670	27,671
New Jersey	12,155	12,253	20,979	11,316	11,202	19,839
Pennsylvania	31,299	27,090	43,215	25,008	24,907	37,565
North Central Region	118,015	114,091	157,412	111,807	108,507	143,833
Ohio	28,459	27,826	45,523	r26,102	r25,578	39,377
Illinois	22,118	21,463	48,535	r20,202	r19,606	r45,768
South Region	312,792	285,753	316,777	277,918	257,764	295,164
South Atlantic Division	62,785	55,127	75,715	61,521	54,701	71,948
West Virginia	21,697	14,774	19,896	21,977	15,384	16,485
East South Central Division	62,417	59,466	56,255	29,345	26,517	44,145
Tennessee	16,977	15,161	14,770	11,770	10,112	9,860
Alabama	36,841	36,688	34,677	10,178	10,008	29,703
West South Central Division	187,590	171,160	184,807	187,052	176,546	179,071
Texas	137,270	127,336	134,058	138,926	133,278	130,221
West Region	157,892	154,180	132,322	111,312	105,401	115,879
Mountain Division	115,686	114,134	42,077	66,599	r66,522	r36,835
Pacific Division	42,206	40,046	90,245	44,713	r38,879	79,044
California	36,967	36,272	79,439	41,602	35,769	70,430

rRevised by 5 percent or more from previously published figures.

Table 8. PRODUCTION AND SHIPMENTS OF OXYGEN (TOTAL), BY GEOGRAPHIC AREA: 1984 AND 1983

(Production and quantity in million cubic feet; value in thousands of dollars)

Geographic area	1984			1983		
		Shipments			Shipments	
	Production	Quantity	Value	Production	Quantity	Value
Total	390,465	350,155	653,648	345,881	318,207	591,028
Northeast Region	30,767	30,194	68,363	35,405	35,086	73,671
New England Division	1,404	1,399	5,667	1,506	1,493	5,139
Middle Atlantic Division	29,363	28,795	62,696	33,899	33,593	68,532
New York	3,163	3,036	8,048	6,085	5,832	12,080
New Jersey	3,663	3,596	9,512	3,839	3,803	11,394
Pennsylvania	22,537	22,164	45,136	23,974	23,923	45,060
North Central Region	140,769	127,573	238,355	130,288	119,024	217,325
Ohio	43,613	43,485	81,602	38,173	37,998	67,606
Michigan	14,151	(D)	(D)	12,703	(D)	(D)
South Region	193,153	170,542	296,579	156,038	140,915	250,870
South Atlantic Division	35,572	34,770	56,811	30,095	29,138	49,615
East South Central Division	28,710	26,928	47,571	18,607	17,287	34,666
West South Central Division	128,871	108,844	192,197	107,336	94,490	166,589
Texas	92,215	86,870	153,360	79,386	74,726	133,301
West Region	25,776	21,846	50,351	r24,150	23,181	49,162
Mountain Division	10,289	10,206	19,992	r10,582	10,316	19,348
Pacific Division	15,487	11,640	30,359	13,568	12,865	29,814
California	12,915	9,401	20,970	10,676	10,737	21,953

(D) Data withheld to avoid disclosing figures for individual companies. rRevised by 5 percent or more from previously published figures.

Table 9. PRODUCTION OF HYDROGEN, NITROGEN, AND OXYGEN (TOTAL), BY MODE OF DISTRIBUTION OR USE, BY GEOGRAPHIC AREA: 1984 AND 1983

Region and State	1984							1983						
		Gas			Liquid				Gas			Liquid		
	Total	Produced for pipeline shipment	Produced for cylinder shipment	Produced for consumption at producing plant	Produced for pipeline shipment	Produced for cylinder shipment	Produced for consumption at producing plant	Total	Produced for pipeline shipment	Produced for cylinder shipment	Produced for consumption at producing plant	Produced for pipeline shipment	Produced for cylinder shipment	Produced for consumption at producing plant
Hydrogen, total	107,359	[1]35,829	[1]11,158	[1]60,372	(1)	(1)	(1)	103,354	[1]34,365	[1]8,977	[1]60,012	(1)	(1)	(1)
Northeast Region	8,186	3,647	2,080	2,459	(1)	(1)	(1)	9,452	3,953	1,863	3,636	(1)	(1)	(1)
North Central Region	6,790	1,907	1,208	3,675	(1)	(1)	(1)	7,035	1,918	1,123	r52,382	(1)	(1)	(1)
South Central Region and West	92,383	30,275	7,870	54,238	(1)	(1)	(1)	86,867	28,494	5,991	(D)	(1)	(1)	(1)
East South Central Division	2,271	(D)	(D)	(D)	(1)	(1)	(1)	3,326	(D)	(D)	(D)	(1)	(1)	(1)
West South Central Division	76,282	(D)	(D)	(D)	(1)	(1)	(1)	69,810	(D)	(D)	r18,192	11,093	(2)	r5,107
Nitrogen, total	660,527	469,055	157,524	18,035	9,693	(2)	6,220	560,124	391,027	134,468	(D)	(D)	(2)	(D)
Northeast Region	71,828	31,232	(D)	(D)	(D)	(2)	(D)	59,287	27,641	(D)	(D)	(D)	(2)	(D)
New England Division	7,086	(D)	(D)	(D)	(D)	(2)	(D)	6,492	(D)	(D)	(D)	(D)	(2)	(D)
Middle Atlantic Division	64,742	(D)	32,762	(D)	(D)	(2)	(D)	52,795	(D)	23,318	(n)	(D)	(2)	(D)
New York	21,288	(D)	12,311	-	-	(2)	-	16,471	(D)	8,254	-	(D)	(2)	(D)
New Jersey	12,155	(D)	6,462	-	(D)	(2)	-	11,316	(D)	5,741	-	(D)	(2)	
Pennsylvania	31,299	16,236	13,989				(D)	25,008	14,433	9,323				(D)
North Central Region	118,015	70,839	41,817	(D)	(D)	(2)	(D)	111,607	69,571	r36,574	(D)	(D)	(2)	(D)
Ohio	28,459	13,982	12,543	(D)	(D)	(2)	(D)	26,102	13,617	r10,431	(D)	(D)	(2)	(D)
Illinois	22,118	6,876	13,583	(D)	(D)	(2)	(D)	20,202	r6,755	r11,848				(D)
South Region	312,792	242,996	47,507	(D)	(D)	(2)	(D)	277,918	211,912	42,647	(D)	(D)	(2)	(D)
South Atlantic Division	62,785	40,408	16,664	(D)	(D)	(2)	(D)	61,521	36,890	16,328	(D)	(D)	(2)	(D)
West Virginia	21,697	13,189	4,126	(D)	(D)	(2)	(D)	21,977	11,890	3,205	(D)	(D)	(2)	-
East South Central Division	62,417	50,629	8,120	(D)	(D)	(2)	(D)	29,345	19,906	6,497	(D)	-	(2)	(D)
Tennessee	16,977	11,941	(D)	-	(D)	(2)	(D)	11,770	r8,116	(D)	-	(D)	(2)	(D)
Alabama	36,481	(D)	(D)	(D)	(D)	(2)	(D)	10,178	(D)	(D)	(D)	(D)	(2)	(D)
West South Central Division	187,590	151,959	22,723	(D)	(D)	(2)	(D)	187,052	r155,116	19,822	(D)	(D)	(2)	
Texas	137,270	116,789	14,007				(D)	138,926	120,446	12,444				(D)
West Region	157,892	123,988	(D)	(D)	(D)	(2)	(D)	111,312	81,903	(D)	(D)	(D)	(2)	(D)
Mountain Division	115,686	(D)	(D)	-	(D)	(2)	(D)	66,599	(D)	(D)	-	(D)	(2)	(D)
Pacific Division	42,206	(D)	24,746	(D)	(D)	(2)	(D)	44,713	(D)	22,615	(D)	(D)	(2)	(D)
California	36,967	(D)	21,767	(D)	(D)	(2)	(D)	41,602	(D)	20,187	(D)	(D)	(2)	(D)
Oxygen, total	390,465	278,516	[3] [4]77,664	[5]34,285	[4](D)	(3)	(5)	345,881	249,876	[3] [4]68,850	[5]27,155	[4](D)	(3)	(5)
Northeast Region	30,767	(D)	(D)	(D)	(D)	(3)	(5)	35,405	(D)	(D)	(D)	(D)	(3)	(5)
New England Division	1,404	-	(D)	(D)	-	(3)	(5)	1,506	-	(D)	(D)	(D)	(3)	(5)
Middle Atlantic Division	29,363	(D)	(D)	(D)	(D)	(3)	(5)	33,899	(D)	(D)	(D)	(D)	(3)	(5)
New York	3,163	(D)	2,937	(D)	(D)	(3)	(5)	6,085	(D)	2,962	-	(D)	(3)	(5)
New Jersey	3,663	(D)	(D)	-	(D)	(3)	(5)	3,839	(D)	(D)	(D)	(D)	(3)	
Pennsylvania	22,537	1,435	(D)	(D)	(D)	(3)	(5)	23,974	17,874	(D)	(D)	(D)	(3)	(5)
North Central Region	140,769	(D)	(D)	(D)	(D)	(3)	(5)	130,288	(D)	(D)	(D)	(D)	(3)	(5)
Ohio	43,613	34,239	(D)	(D)	(D)	(3)	(5)	38,173	30,646	(D)	(D)	(D)	(3)	(5)
Michigan	14,151	(D)	(D)	(D)	(D)	(3)	(5)	12,703	(D)	(D)				(5)
South Region	193,153	142,147	28,684	27,322	(D)	(3)	(5)	156,038	115,434	25,497	15,107	(D)	(3)	(5)
South Atlantic Division	35,572	24,263	(D)	(D)	(D)	(3)	(5)	30,095	19,632	(D)	(D)	(D)	(3)	(5)
East South Central Division	28,710	21,389	(D)	(D)	(D)	(3)	(5)	18,607	12,887	(D)	(D)	(D)	(3)	(5)
West South Central Division	128,871	96,495	12,279	20,097	(D)	(3)	(5)	107,336	82,915	11,580	12,841	(D)	(3)	(5)
Texas	92,215	78,288	(D)	(D)	(D)	(3)	(5)	79,386	66,689	(D)	(D)	(D)	(3)	(5)
West Region	25,776	(D)	9,627	(D)	(D)	(3)	(5)	r24,150	(D)	9,221	(D)	(D)	(3)	(5)
Mountain Division	10,289	(D)	(D)	(D)	(D)	(3)	(5)	r10,582	(D)	(D)	(D)	(D)	(3)	(5)
Pacific Division	15,487	(D)	(D)	(D)	(D)	(3)	(5)	13,568	(D)	(D)	(D)	(D)	(3)	(5)
California	12,315	(D)	(D)	(D)	(D)	(3)	(5)	10,676	(D)	(D)				

- Represents zero. (D) Data withheld to avoid disclosing figures for individual companies. rRevised by 5 percent or more from previously published figures.

[1]Figures for liquid hydrogen and hydrogen gas are collected together.
[2]Figures for liquid nitrogen and nitrogen gas produced for cylinder shipment are collected together.
[3]Figures for liquid oxygen and oxygen gas produced for cylinder shipment are collected together.
[4]Liquid oxygen produced for pipelines shipment is combined with oxygen liquid and gas produced for cylinder shipment to avoid disclosing figures for individual companies.
[5]Figures for liquid oxygen and oxygen gas produced for consumption at the same plant are collected together.

Table 10. PRODUCTION OF SPECIFIED INDUSTRIAL GASES, BY MONTH: 1984 AND 1983

(Production in million cubic feet, except where otherwise noted)

Product code	Product description	Year	Total	January	February	March	April	May	June	July	August	September	October	November	December
28132 —	Acetylene	1984	4,968	331	389	471	407	466	438	446	366	352	388	450	443
		1983	3,901	277	268	292	313	368	299	294	352	353	345	372	368
28132 11	Produced for compression, including cylinder and pipeline	1984	1,113	101	103	97	104	104	82	75	87	73	101	96	90
		1983	1,123	103	99	113	94	91	84	69	83	89	99	101	98
28132 21	Produced for pipeline shipment, (excluding that produced to be compressed) and for consumption in this plant	1984	r3,855	r230	r286	r374	r303	r362	r356	r371	r279	r300	r387	r354	r353
		1983	r2,778	r174	r169	r179	r219	r277	r215	r225	r269	r264	r246	r271	r270
	Carbon dioxide:														
28133 01	Gas (short tons)[1]	1984	3,481,547	311,769	278,186	326,738	295,007	296,830	307,323	307,964	310,389	270,512	277,675	264,966	234,188
		1983	3,361,019	293,564	296,802	256,468	253,502	275,407	269,821	281,681	300,712	257,861	293,671	288,515	293,015
28133 02	Liquid (short tons)[2]	1984	4,209,147	321,619	287,096	320,790	339,583	420,300	359,039	368,030	380,534	384,138	355,818	339,309	332,901
		1983	3,552,611	296,277	275,720	296,972	283,349	285,173	307,425	319,117	338,358	312,883	301,143	286,785	249,409
28133 31	Solid (short tons)	1984	355,708	27,044	27,473	26,758	33,101	37,740	32,336	37,256	34,731	27,489	26,440	24,534	20,806
		1983	366,106	25,603	23,468	26,712	25,301	30,896	36,157	37,825	42,004	34,911	30,103	28,288	25,738
28135 00	Nitrogen	1984	660,527	55,134	52,985	57,454	51,967	54,278	54,419	54,653	54,826	55,071	56,714	56,979	56,047
		1983	560,124	43,330	41,590	45,408	45,154	46,611	43,943	49,164	49,997	47,834	48,895	48,406	49,792
	Gas:														
28135 11	Produced for pipeline shipment	1984	469,055	39,845	38,289	41,323	36,789	38,119	38,174	38,499	38,647	38,748	39,590	40,960	40,072
		1983	391,027	30,123	28,438	31,452	31,636	32,660	30,833	35,228	35,406	33,125	33,870	33,656	34,600
28135 13	Produced for consumption in this plant	1984	18,035	1,411	1,337	1,430	1,603	1,687	1,278	1,409	1,581	1,493	1,756	1,538	1,512
		1983	18,192	1,495	1,477	1,720	1,648	1,243	1,338	1,418	1,327	1,546	1,577	1,634	1,749
	Liquid:														
28135 21	Produced for bulk shipment to pipeline or to other air separation plants	1984	9,693	632	618	625	831	698	720	822	818	829	1,221	901	978
		1983	11,330	883	911	878	1,102	1,118	832	961	878	882	1,111	798	976
28135 23	Produced for consumption in this plant	1984	r6,220	r540	r493	r550	r467	r502	r587	r589	r457	r508	r544	r467	r516
		1983	r5,107	r392	r437	r431	r374	r379	r367	r438	r422	r392	r582	r404	r489
28135 41	Liquid and gas, produced for cylinder and bulk delivery	1984	157,524	12,706	12,248	13,526	12,277	13,272	13,660	13,334	13,323	13,493	13,603	13,113	12,969
		1983	134,468	10,437	10,327	10,927	10,394	11,211	10,573	11,119	11,964	11,889	11,755	11,894	11,978
28136 00	Oxygen	1984	385,390	31,252	31,957	34,898	36,433	33,329	32,977	32,923	31,386	29,582	31,153	30,011	29,489
		1983	345,881	27,595	27,768	29,040	28,682	28,657	28,027	29,551	29,513	29,692	29,594	29,631	28,131
28136 11	Gas, produced for pipeline shipment	1984	278,516	22,888	23,586	25,348	27,808	24,647	23,945	23,515	22,430	20,657	22,097	20,723	20,872
		1983	249,876	19,178	19,787	21,595	20,856	21,521	20,623	21,054	21,023	22,570	21,947	20,498	19,224
28136 21	Liquid produced for bulk shipment to pipeline or to other air separation plants	1984	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
		1983	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
28136 31	Liquid and gas: Produced for cylinder and bulk delivery shipment	1984	77,664	6,464	6,453	7,197	7,284	6,519	6,133	6,138	6,298	6,469	6,329	6,668	5,712
		1983	68,850	5,487	5,568	5,616	5,720	5,323	5,420	5,680	5,757	5,916	6,222	6,145	5,996
28136 41	Produced for consumption in this plant	1984	r34,285	r3,065	r3,120	r3,644	r2,758	r2,163	r2,849	r3,270	r2,658	r2,456	r2,727	r2,620	r2,905
		1983	r27,155	r2,930	r2,413	r1,829	r2,106	r1,813	r1,984	r2,817	r2,733	r1,206	r1,425	r2,988	r2,911
28137 15	Argon, high purity produced for cylinder and bulk delivery and pipeline shipments and for consumption in this plant	1984	10,587	861	889	1,023	962	816	801	804	813	857	819	1,013	929
		1983	8,330	639	630	716	697	736	678	664	665	719	692	772	722
28137 20	Hydrogen	1984	109,359	9,431	8,940	9,153	8,780	10,433	9,634	9,164	8,834	8,422	8,144	8,699	9,925
		1983	103,354	8,049	8,291	8,226	8,376	8,295	8,399	8,670	7,892	8,134	10,057	9,364	9,601
28137 21	Produced for cylinder and bulk delivery shipment	1984	11,158	1,270	1,060	882	920	1,183	966	988	647	766	779	709	988
		1983	8,977	671	673	692	633	695	702	756	650	617	924	729	1,235
28137 31	Produced for pipeline shipment and Government use	1984	35,829	3,001	2,802	3,045	3,218	3,624	2,892	2,706	2,965	3,000	2,819	2,712	3,045
		1983	34,365	2,993	2,885	2,908	3,179	3,154	2,529	2,669	2,497	2,704	2,976	3,067	2,804
28137 41	Produced for consumption in this plant	1984	60,372	5,160	5,078	5,226	4,642	5,626	5,576	5,470	5,222	4,636	4,546	4,278	4,892
		1983	60,012	4,385	4,733	4,626	4,564	4,446	5,168	5,245	4,745	4,813	6,157	5,568	5,562

r Revised by 5 percent or more from previously published figures.

[1] See footnote 1, table 1.
[2] See footnote 2, table 1.
[3] Data for liquid oxygen produced for bulk delivery shipment are combined with liquid and gas oxygen produced for cylinder and bulk delivery shipment to avoid disclosing figures for individual companies.

Table 11A. NUMBER OF ESTABLISHMENTS REPORTING THE PRODUCTION OF SELECTED INDUSTRIAL GASES, BY STATE: 1984

State	Acetylene	Carbon dioxide			Nitrogen	Oxygen	Argon (refined)	Hydrogen	Nitrous oxide
		Gas	Liquid	Solid					
United States	169	46	69	35	357	186	117	109	5
New England	4	-	-	1	16	3	2	2	-
Maine	-	-	-	-	1	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-
Vermont	-	-	-	-	2	-	-	-	-
Massachusetts	2	-	-	1	5	2	1	1	-
Rhode Island	1	-	-	-	1	-	-	-	-
Connecticut	1	-	-	-	7	1	1	1	-
Middle Atlantic	18	-	5	1	48	26	18	8	1
New York	5	-	1	-	11	7	4	2	-
New Jersey	4	-	1	1	11	5	2	1	1
Pennsylvania	9	-	3	-	26	14	12	5	-
East North Central	29	8	10	8	70	39	24	25	1
Ohio	11	1	4	4	28	18	11	8	1
Indiana	7	-	1	-	9	5	4	2	-
Illinois	4	6	4	3	21	11	6	12	-
Michigan	4	1	-	-	9	3	2	3	-
Wisconsin	3	-	1	1	3	2	1	-	-
West North Central	12	7	7	4	11	6	1	2	1
Minnesota	1	2	1	-	1	1	1	-	-
Iowa	3	1	3	3	4	1	-	-	-
Missouri	1	2	1	1	5	2	-	-	-
North Dakota	-	-	-	-	1	-	-	-	-
South Dakota	3	-	-	-	-	-	-	-	
Nebraska	1	-	-	-	-	-	-	1	-
Kansas	3	2	2	-	1	2	-	1	1
South Atlantic	25	3	10	5	54	24	13	13	1
Delaware	-	1	2	-	1	1	1	4	-
Maryland	2	-	-	-	5	2	2	1	-
District of Columbia	-	-	-	-	-	-	-	-	-
Virginia	2	-	2	1	4	4	-	1	-
West Virginia	4	-	1	-	13	4	2	2	-
North Carolina	4	1	-	-	8	3	1	1	-
South Carolina	1	-	1	-	11	5	3	1	-
Georgia	4	-	2	1	5	3	2	3	1
Florida	8	1	2	3	7	2	2	-	-
East South Central	15	7	7	1	40	18	9	14	-
Kentucky	4	2	2	-	9	4	2	4	-
Tennessee	6	3	2	1	15	5	3	5	-
Alabama	3	2	1	-	13	6	4	4	-
Mississippi	2	-	2	-	3	3	-	1	-
West South Central	29	14	14	7	62	40	27	30	-
Arkansas	1	-	-	-	1	2	1	-	-
Louisiana	5	4	4	1	19	12	6	10	-
Oklahoma	2	2	2	1	6	2	2	-	-
Texas	21	8	8	5	36	24	20	20	-
Mountain	15	1	5	2	24	9	8	2	-
Montana	3	1	1	-	-	1	-	-	-
Idaho	1	-	-	-	1	-	-	-	-
Wyoming	1	1	1	-	5	-	-	-	-
Colorado	3	-	1	-	6	1	2	1	-
New Mexico	2	-	-	-	1	1	1	-	-
Arizona	2	-	1	1	4	2	2	-	-
Utah	2	-	1	1	7	4	3	1	-
Nevada	1	-	-	-	-	-	-	-	-
Pacific	22	6	11	5	32	21	15	13	1
Washington	4	1	2	3	4	6	4	2	-
Oregon	3	-	1	-	2	1	-	1	-
California	12	5	7	2	23	11	10	8	1
Alaska	1	-	-	-	1	1	-	-	-
Hawaii	2	-	1	1	2	2	1	2	-

- Represents zero.

Table 11B. NUMBER OF ESTABLISHMENTS REPORTING THE PRODUCTION OF SELECTED INDUSTRIAL GASES, BY STATE: 1983

State	Acetylene	Carbon dioxide			Nitrogen	Oxygen	Argon (refined)	Hydrogen	Nitrous oxide
		Gas	Liquid	Solid					
United States	186	48	73	36	348	179	113	114	6
New England	4	1	-	1	15	3	2	2	-
Maine	-	-	-	-	1	-	-	-	-
New Hampshire	-	-	-	-	-	-	-	-	-
Vermont	-	-	-	-	2	2	-	-	-
Massachusetts	2	-	-	1	4	-	1	1	-
Rhode Island	1	-	-	-	1	1	-	-	-
Connecticut	1	-	-	-	7	-	1	1	-
Middle Atlantic	18	-	4	2	48	25	19	8	1
New York	5	-	-	-	11	6	5	2	-
New Jersey	4	-	1	2	11	5	2	2	1
Pennsylvania	9	1	3	-	26	14	12	4	-
East North Central	33	8	13	9	70	41	25	26	1
Ohio	12	1	5	4	28	19	12	10	1
Indiana	7	1	2	1	9	5	4	2	-
Illinois	5	6	5	3	20	12	6	11	-
Michigan	6	-	-	-	10	3	2	3	-
Wisconsin	3	-	1	1	3	2	1	-	-
West North Central	14	6	9	4	14	3	1	3	1
Minnesota	1	2	1	-	1	1	1	-	-
Iowa	4	-	6	3	4	-	-	-	-
Missouri	1	2	1	1	6	2	-	1	-
North Dakota	-	-	-	-	1	-	-	-	-
South Dakota	3	-	-	-	-	-	-	-	-
Nebraska	1	-	-	-	-	-	-	1	-
Kansas	4	2	1	-	2	-	-	1	1
South Atlantic	26	5	12	5	53	23	12	14	1
Delaware	-	1	2	-	2	2	1	4	-
Maryland	2	-	-	-	5	2	2	1	-
District of Columbia	-	-	-	-	-	-	-	-	-
Virginia	2	-	2	1	4	3	1	2	-
West Virginia	4	1	1	-	13	4	2	3	-
North Carolina	4	1	-	-	8	3	1	1	-
South Carolina	1	-	1	-	9	4	1	-	-
Georgia	4	1	2	1	5	3	2	3	1
Florida	9	1	4	3	7	2	2	-	-
East South Central	15	6	8	1	38	16	9	17	1
Kentucky	4	2	1	-	10	4	2	4	-
Tennessee	6	2	3	1	15	5	4	8	1
Alabama	3	2	1	-	10	5	3	4	-
Mississippi	2	-	3	-	3	2	-	1	-
West South Central	32	16	15	7	57	39	24	27	-
Arkansas	1	-	-	-	1	2	1	-	-
Louisiana	6	4	4	1	19	11	5	10	-
Oklahoma	2	3	3	1	5	2	2	-	-
Texas	23	9	8	5	35	24	18	17	-
Mountain	18	1	3	2	21	10	6	2	-
Montana	4	-	1	-	-	1	-	-	-
Idaho	1	1	-	-	1	-	-	-	-
Wyoming	1	-	1	-	5	-	-	-	-
Colorado	3	-	-	1	5	2	1	1	-
New Mexico	2	-	-	-	3	1	1	-	-
Arizona	3	-	-	-	7	2	2	-	-
Utah	3	-	1	1	-	4	2	1	-
Nevada	1	-	-	-	-	-	-	-	-
Pacific	22	5	9	5	32	19	15	15	1
Washington	4	1	1	2	2	4	3	2	-
Oregon	3	-	1	-	2	-	-	1	-
California	11	4	6	2	25	12	10	9	1
Alaska	2	-	-	-	1	1	-	-	-
Hawaii	2	-	1	1	2	2	1	3	-

- Represents zero.

DESCRIPTION OF SURVEY

Scope of Survey. This survey covers firms manufacturing selected industrial gases. Excluded from this survey are data for liquified petroleum gases and organic gases, which are reported to the International Trade Commission, and sulfur dioxide and chlorine, which are included in Current Industrial Reports Series MA28A, *Inorganic Chemicals.*

Survey Methodology. The statistics in this publication were collected by mail on Bureau of the Census annual Form MA28C, Industrial Gases. The survey panel includes all known producers of industrial gases, approximately 800 establishments. Approximately 50 establishments, which produce carbon dioxide as a by-product, were added to this survey for 1981. They were previously omitted in error. For 1981, they accounted for approximately 75 percent of carbon dioxide gas production and 15 percent of carbon dioxide liquid production. Data for years prior to 1981 were not requested, therefore, information for 1981 for carbon dioxide gas and liquid are not comparable to prior years.

Reliability of Data. Survey error may result from several sources: (1) inability to obtain information about all cases in the survey; (2) response errors; (3) definitional difficulties; (4) differences in the interpretation of questions; (5) mistakes in recording or coding the data obtained; and (6) other errors of collection, response, coverage, and estimation for missing data. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is due to imputing data for nonrespondents, for late reporters, for data which fail logic edits, and for small companies not included in the survey panel. Missing figures are imputed based on yearly movements shown by reporting firms. Imputation generally is limited to a maximum of 5 percent for any one data cell. Figures with imputation rates greater than 5 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse, because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is not precisely known, but is assumed to be small. The degree of uncertainty regarding the accuracy of the published data, however, increases as the percentage of imputation increases. Figures with imputation rates above 15 percent should be used with caution.

Revisions to Previous Period Data. Statistics for previous years may be revised as the result of corrected data from respondents, late reports for which imputations were made as described above, or other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Adjustment for Price Change. All dollar figures included in this publication are in current dollars; i.e., they have not been adjusted for price change.

EXPLANATION OF TERMS

Quantity and Value of Shipments. The figures on quantity and value of shipments represent physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to a company's own branches are assigned the same value as comparable sales to unaffiliated customers; i.e., the value includes an appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Production. Data shown for production represent total quantity of each chemical produced, including quantity consumed in plants, and for sale or transfer to other plants or warehouses of the same company. The statistics presented in the tables provide an up-to-date measure of activity in the inorganic field, but do not necessarily indicate amounts entering the market. In some cases, figures are included for material produced "in process" as an intermediate to the end of products.

Unit of Measure. All figures included in this report are shown in million cubic feet, 70°F, at 1 atmosphere pressure, unless otherwise specified.

Carbon Dioxide

Gas. Includes all gas produced that is not vented, regardless of whether it will be used as a gas or to make liquid or solid. Also includes natural CO_2 produced from well operations. Excludes amounts produced and consumed in the manufacture of urea or soda ash.

Hydrogen. Excludes amounts produced and consumed in the manufacture of synthetic ammonia, synthetic methanol, petroleum products (hydrocracking and hydrotreating), and amounts produced by the ammonia dissociation process (cracking of ammonia).

Nitrogen/Oxygen. Excludes amounts produced and consumed in the manufacture of synthetic ammonia and ammonia derivatives.

HISTORICAL NOTE

Data on industrial gases have been collected by the Bureau of the Census since 1941. Historical data may be obtained from Current Industrial Reports (called Facts for Industry before 1959)

available at your local Federal Depository Library. A list of these libraries may be obtained from the Bureau of the Census regional offices:

Office	Telephone
Atlanta, Georgia	(404) 881-2271
Boston, Massachusetts	(617) 223-2327
Charlotte, North Carolina	(704) 371-6142
Chicago, Illinois	(312) 353-6251
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